cardboard, there are mentioned sheet-like materials, such as cloth, felt of a high density, resin board, lead sheet, insulation board and thin board, which have density per area from 0.01 g/cm^2 to 1.0 g/cm^2, preferably, 0.02 g/cm^2 to 0.5 g/cm^2; density per volume of higher than 0.1 g/cm^3; high internal loss; and low elasticity. The material can be properly selected depending on a wavelength of resonating sound and resulting tone. The sheet-like materials may not be necessarily porous. Also, the partition walls may not necessarily have a known sound absorbing material of volume density of less than 0.05 g/cm^3, such as glass wool, filled therein.

Assuming that L denotes a maximum inner length among the width, depth, and height of the cabinet, the partition wall, as shown by the embodiments in FIGS. **6**, **7** and **8**, has to be semi-transmissive for at least sounds of wavelengths near the dimension L in a longitudinal direction of the cabinet, for example, a wavelength of L or a wavelength of twice of L. That is, the partition wall has to be semi-transmissive for sounds of lower frequencies in the standing waves. It is obvious that a full-transmissive partition wall is not effective. The full-reflective partition wall produces standing waves of different wavelengths in case the partition wall has no diffusion effect, which causes a problem that reduces an effective capacity of the cabinet. Assuming that l denotes a maximum dimension among width, depth, and height of the space enclosed by the partition walls, the dimension l may be preferably made shorter than L. A closed end of the space may be preferably formed in between one-half and four-fifths of a distance from one longitudinal end of the cabinet to the other. Also, it is desirable that a ratio of cross-sections of the space and the cabinet is larger than one to five, in the cross-sections crossing the longitudinal direction of the cabinet and located between one-half and four-fifths of the distance from the one end of the longitudinal direction to the other. A total capacity of a space having no sound source of resonant sounds in the above-mentioned space is preferably one-tenth to four-fifths of a capacity of the cabinet. A total area of opening areas of the space surrounded by the partition walls is less than one-tenth of a total surface area of the partition walls. The partition walls forming the space preferably include a partition wall for dividing the longitudinal direction of the cabinet and a partition wall for dividing a crosswise direction of the cabinet.

A simple way is that a tubular space formed of cardboard or corrugated cardboard should be arranged in the cabinet as described below.

First, two or three medium closed spaces having a cross-section of one-half to two-thirds of that of the cabinet should be arranged in series from one end to the other in the longitudinal direction of the cabinet. The two or three medium closed spaces arranged in series may be divided into more than two or three sets of slender medium closed spaces. The medium closed spaces may have two or three small closed spaces having a cross-section of one-half of that of the medium closed space arranged therein in series in the longitudinal direction of the cabinet as needed. In case the small closed spaces are arranged outside the medium closed spaces, the cross-sections of the small closed spaces and the medium closed spaces should be one-fourths to one-thirds of that of the cabinet, respectively.

Incidentally, the cabinet and spaces may have a little sound absorbing material added therein, as desired.

Further, in the eighth embodiment shown in FIG. **9**, the cabinet may have a corrugated cardboard stacked to the inside thereof and may be cut into several cabinets. The separated cabinets may be stacked to form a cabinet. This structure can suppress unnecessary resonance of the cabinet without making the cabinet heavy. Further, the acoustic isolation wall of plywood or the like may have a corrugated cardboard layer therein. This structure can decrease a coefficient of reflection of the sound wave, so that the standing wave can be attenuated faster. Incidentally, the corrugated cardboard layer integrated with the wooden plate forming the cabinet may be replaced by a laminated composite corrugated cardboard layer to be further thickened. Both the wooden plate and the corrugated cardboard layer may be replaced by a similar structure of resin. Also, to make easy replacement of the speaker unit, the speaker unit hung on the middle cabinet **32** by a chain and the front baffle may be constructed so that they can be removed as a unit. Further, the top and the bottom plates of the cabinet may have a box similar to the closed box **38** formed of a double-wall corrugated cardboard adhered to insides thereof.

INDUSTRIAL AVAILABILITY

The speaker system and a method for improving tone quality thereof according to the present invention are also available for an air-tight, bass-reflex, or back-opening speaker system and a horn speaker system having a speaker cabinet.

What is claimed is:

1. A speaker system for a speaker comprising,
   - a cabinet formed of an acoustic isolation wall, and having a maximum length L among width, depth and height of an inside of the cabinet,
   - a sound source to generate standing waves inside the cabinet,
   - at least one partition wall situated inside the cabinet to form a space by surrounding the space, said partition wall suppressing the standing waves, at least a part of said partition wall being formed of a material which has high internal loss and a density per volume greater than 0.1 g/cm^3, and a closed end portion surrounding the space, said closed end portion being formed of at least one of the partition wall and the acoustic isolation wall,
   - wherein said material has a density per area from 0.01 g/cm^2 to 0.21 g/cm^2 and a characteristic of semi-transmission for at least two kinds of standing waves of wavelengths of the length L and twice of said length L among the standing waves, said space is a substantially closed space, and a surface of said partition wall directed toward the sound source is substantially flat and uninterrupt by any protrusion.

2. A speaker system according to claim **1**, wherein said space has a total capacity more than one tenth of a capacity of the cabinet.

3. A speaker system according to claim **1**, wherein said partition wall is made of paper box.

4. A method of improving sound quality of a speaker system having a cabinet formed of an acoustic isolation wall, said cabinet having a maximum length L among width, depth and height of an inside of the cabinet, comprising forming at least one partition wall to form a space for suppressing standing waves generated inside the cabinet by a sound source and a closed end portion surrounding the space, at least a part of said partition wall being formed of a material which has high internal loss and a density per volume greater than 0.1 g/cm^3, and said closed end portion being formed of at least one of the partition wall and the acoustic isolation wall wherein said material has a density per area from 0.01 g/cm^2 to 0.21 g/cm^2 and a characteristic of semi-transmission for at least two kinds of standing

waves of wavelengths of the length L and twice of said length L among the standing waves, said space is a substantially closed space, and a surface of said partition wall directed toward the sound source is substantially flat and uninterrupt by any protrusion.

5. A method (of improving sound quality of a speaker system) according to claim 4, wherein said partition wall is made of paper box.

6. A speaker system for a speaker comprising,

a cabinet (7) formed of acoustic isolation walls (2, 8, 5), and having a maximum length L among width, depth and height of an inside of the cabinet (7), and

at least one partition wall (9, 9*a*, 9*b*) situated inside the cabinet (7) to form a space by surrounding the space, said partition wall (9, 9*a*, 9*b*) suppressing standing waves produced inside the cabinet (7) by a sound source; said partition wall (9, 9*a*, 9*b*) being formed of a material having high internal loss; said space having a total capacity more than one tenth of a capacity of the cabinet (7), wherein a closed end (9*a*) of the space is located between one-half and four-fifths of a distance from one end of the length L to the other end, an opening area (o) of the same space being located at a side opposite to the closed end (9*a*) in a longitudinal direction of the cabinet (7) having the length L; said opening area (o) being located between four-fifths and five-fifths of a distance from one end of the length L to the other end; the partition wall (9, 9*b*) in the longitudinal direction continuing from the closed end (9*a*) to the opening area (o); a cross-sectional dimension of the space being shorter than a depth of the space; and a surface of said partition wall directed toward the sound source is substantially flat and uninterrupt by any protrusion.

7. A speaker system according to claim 6, wherein said partition wall is made of paper box.

8. A method of suppressing standing waves generated inside a cabinet by a sound source, said cabinet being formed of an acoustic isolation wall, said cabinet comprising forming at least one partition wall to form a space and a closed end portion surrounding the space, at least a part of said partition wall being formed of a material which has high internal loss and a density per volume greater than 0.1 g/cm^3, and said closed end portion being formed of at least one of the partition wall and the acoustic isolation wall, wherein said material has a density per area from 0.01 g/cm^2 to 0.21 g/cm^2 and a characteristic of semi-transmission for standing waves, said space is a closed space, and a surface of said partition wall directed toward the sound source is substantially flat and uninterrupt by any protrusion.

9. A method according to claim 8, wherein said partition wall is made of paper box.

* * * * *